Table 1. Contact persons for VPD surveillance laboratory support						
Disease	**Test Name**	**Lab contact name**	**Lab contact phone**	**Lab contact fax**	**Name of Lab**	**Notes**
Diphtheria	culture		( )	( )		
	toxigenicity testing		( )	( )		
	PCR	Dr. Tanya Popovic	(404) 639-1730 (404) 639-4057	(404) 639-3970	CDC Diphtheria Laboratory	
	serology (antibodies to diphtheria toxin)		( )	( )		
Haemophilus influenzae	culture		( )	( )		
	serotyping		( )	( )		
	antigen detection		( )	( )		
	subtyping		( )	( )		
Hepatitis A	IgM anti-HAV		( )	( )		
	total anti-HAV		( )	( )		
	PCR		( )	( )		

Table 1 (con't). Contact persons for VPD surveillance laboratory support						
Disease	**Test Name**	**Lab contact name**	**Lab contact phone**	**Lab contact fax**	**Name of Lab**	**Notes**
Hepatitis B	IgM anti-HBc		( )	( )		
	HBsAg		( )	( )		
	anti-HBs		( )	( )		
	total anti-HBc					
Influenza	culture/viral isolation		( )	( )		
	antigen detection		( )	( )		
	serology		( )	( )		
Measles	IgM antibody		( )	( )		
	IgG antibody		( )	( )		
	culture		( )	( )		
	PCR					
Mumps	culture		( )	( )		
	IgM antibody		( )	( )		
	IgG antibody		( )	( )		

Table 1 (con't). Contact persons for VPD surveillance laboratory support						
Disease	**Test Name**	**Lab contact name**	**Lab contact phone**	**Lab contact fax**	**Name of Lab**	**Notes**
Pertussis	culture		( )	( )		
	PCR		( )	( )		
	DFA		( )	( )		
Pneumococcal disease	culture		( )	( )		
	penicillin resistance		( )	( )		
Poliomyelitis	culture		( )	( )		
	intratypic differentiation	Dr. Mark Pallansch	(404) 639-2749	(404) 639-1307	CDC Polio Laboratory	
	serology					
	CSF analysis		( )	( )		
Rubella	IgG antibody		( )	( )		
	IgM antibody		( )	( )		
	culture					
	PCR	Dr. Teryl Frey	(404) 651-0927	( )		

Table 1 (con't). Contact persons for VPD surveillance laboratory support						
Disease	**Test Name**	**Lab contact name**	**Lab contact phone**	**Lab contact fax**	**Name of Lab**	**Notes**
Congenital rubella syndrome	IgG antibody					
	IgM antibody					
	culture					
	PCR					
Varicella	serology		( )	( )		
	DFA					
	culture		( )	( )		
	viral typing/ strain identification		(800) 672-6372	( )	Merck and Co., Inc.	

Table 2. Confirmatory and Other Useful Tests for the Surveillance of Vaccine-Preventable Diseases		
	Confirmatory Test(s)	**Other useful tests**
Diphtheria	culture toxigenicity testing PCR	serology (antibodies to diphtheria toxin)
Haemophilus influenzae	culture	serotyping (identification of capsular type of encapsulated strains)* antigen detection subtyping
Hepatitis A	IgM anti-HAV (positive)	total anti-HAV (marker of immunity) PCR
Hepatitis B	IgM anti-HBc (positive); or HBsAg (positive) and IgM anti-HAV (negative)	anti-HBs (marker of immunity); total anti-HBc (marker of infection)
Influenza	culture antigen detection (EIA, IFA, EM) serology PCR	
Measles	IgM paired sera for IgG	culture (for molecular epi) PCR
Mumps	culture IgM IgG	IgG-for immunity testing
Pertussis	culture PCR	DFA-for screening serologic testing
Pneumococcal disease	culture	penicillin resistance
Poliomyelitis	culture-from stool, pharynx, or CSF	intratypic differentiation (wild vs vaccine type) paired serology CSF analysis
Rubella	paired sera for IgG IgM culture	PCR
Tetanus	there are no lab findings characteristic of tetanus	serology to test for immunity
Varicella	culture serology	Viral typing/strain identification DFA

Table 3. Specimen collection for laboratory testing for VPDs

Disease	Test name	Specimens to take	Timing for specimen collection	Transport requirements	Collection requirements	Other notes
Diphtheria	culture	swab of nose, throat, membrane	ASAP, when diphtheria is suspected	< 24 hrs: Amies or similar transport medium > = 24 hrs: silica gel sachets	State health departments may call CDC diphtheria lab at 404-639-1730 or 404-639-4057	ALERT lab that diphtheria is suspected, so that tellurite-containing media will be used.
	PCR	swabs (as above), pieces of membrane, biopsy tissue	Take these specimens at same time as those for culture.	Silica gel sachet; or a sterile dry container at 4ºC.	State health departments may call CDC diphtheria lab at 404-639-1730 or 404-639-4057	ALERT lab that diphtheria is suspected, so that specific PCR assay will be used.
	toxigenicity testing (Elek test)	isolate from culture (above)	After *C. diphtheria* has been isolated	Transport medium such as Amies medium, or silica gel sachets	State health departments may call CDC diphtheria lab at 404-639-1730 or 404-639-4057	
	serology (antibodies to diphtheria toxin)	serum	before administration of antitoxin	frozen (-20ºC)		Collect paired sera, taken 2-3 weeks apart.

Table 3. Specimen collection for laboratory testing for VPDs						
Disease	**Test name**	**Specimens to take**	**Timing for specimen collection**	**Transport requirements**	**Collection requirements**	**Other notes**
***Haemophilus influenzae* type b**	culture	blood	ASAP	blood culture bottles w/broth or lysis-centrifugation tube	collect 3 separate samples in a 24-hr period	Request that lab conduct serotyping on any *H. influenzae* isolate from any normally sterile site.
	culture	CSF	ASAP	sterile, screw-capped tube		
	culture	other normally sterile site	ASAP			
	serotyping	isolate from culture (above)				Highest priority are isolates from persons < 15 years.
	antigen detection	any normally sterile site				

Table 3. Specimen collection for laboratory testing for VPDs						
Disease	**Test name**	**Specimens to take**	**Timing for specimen collection**	**Transport requirements**	**Collection requirements**	**Other notes**
Hepatitis A	IgM anti-HAV	serum	ASAP after symptom onset (detectable up to 6 months)	All sera to be tested for serologic markers of HAV and HBV infection can be kept at ambient temperatures, refrigerated, or frozen for short term (< 48 hours). For greater than 48 hours storage, sera should be frozen or refrigerated.	non-hemolyzed	
	total anti-HAV	serum	no time limit		non-hemolyzed	Measures both IgM and IgG.
Hepatitis B	IgM anti-HBc	serum	ASAP after symptom onset (Detectable up to 6 months)		non-hemolyzed	
	HBsAg	serum			non-hemolyzed	Positive HBsAg with negative anti-HAV confirms hepatitis B.
	anti-HBs	serum	1-2 months after vaccination		non-hemolyzed	

Table 3. Specimen collection for laboratory testing for VPDs

Disease	Test name	Specimens to take	Timing for specimen collection	Transport requirements	Collection requirements	Other notes
Influenza	culture/viral isolation	nasal wash, np aspirates, nasal/throat swabs, transtracheal aspirate, bronchoalveolar lavage	within 72 hours of onset of illness	Transport specimens at 4°C if tests are to be performed within 72 hours; otherwise, freeze at -70°C until tests can be performed.		
	antigen detection	nasal wash, np aspirate, nasal/throat swabs, gargling fluid, transtracheal aspirates, bronchoalveolar lavage	within 72 hours of onset of illness	Transport specimens at 4°C if tests are to be performed within 72 hours; otherwise, freeze at -70°C until tests can be performed.		Save an aliquot of the clinical sample for confirmation and isolation. Viral isolates may be further characterized by WHO/CDC.
	serology	paired sera	acute: within one week of onset convalescent: 2-3 weeks after acute	store at 4°C or frozen		Four-fold rise is a positive result. Consider vaccination history.

Table 3. Specimen collection for laboratory testing for VPDs						
Disease	**Test name**	**Specimens to take**	**Timing for specimen collection**	**Transport requirements**	**Collection requirements**	**Other notes**
Measles	culture/PCR	urine, np aspirates, heparinized blood, throat swabs	collect at same time as samples for serology (best within 3 days of rash onset)			PCR for molecular typing. Do not collect if after 10 days from rash onset.
	IgM antibody	serum	ASAP, and repeat 72 hours after onset if first negative			IgM is detectable for at least 28 days after rash onset.
	IgG antibody	paired sera	acute: ASAP after rash onset (7 days at the latest) convalescent: 10-30 days after acute			
Mumps	culture	throat swabs, urine, CSF				
	IgM antibody	serum	ASAP, antibodies peak about a week after onset			
	IgG antibody	paired sera	acute: within several days of onset convalescent: 2 weeks after acute			

Table 3. Specimen collection for laboratory testing for VPDs						
Disease	**Test name**	**Specimens to take**	**Timing for specimen collection**	**Transport requirements**	**Collection requirements**	**Other notes**
Pertussis	culture	posterior nasopharyngeal (NP) swab or aspirate	within the first 2 weeks of cough onset	swabs: half-strength charcoal horse blood agar at 4°C aspirates: in catheter trap at 4°C	use Dacron or calcium alginate (not cotton) swabs with flexible shaft, or aspiration by catheter attached to catheter trap	Inoculate selective primary isolation media such as charcoal horse blood agar or Bordet-Genou as soon as possible. Negative culture does NOT rule out pertussis.
	PCR	NP swab or aspirate	within the first 2 weeks of cough onset	short term at 4°C; long term -20°C or below	use Dacron or calcium alginate (not cotton) swabs with flexible shaft, or aspiration by catheter attached to catheter trap	PCR should be validated with culture when possible.
	serology	acute and convalescent sera	acute: within the first 2 weeks of cough onset convalescent: 2-6 weeks after acute	-20°C		Results are presumptive and should be validated with culture. Serologic results are not currently accepted as laboratory confirmation for purposes of national surveillance.

Table 3. Specimen collection for laboratory testing for VPDs						
Disease	**Test name**	**Specimens to take**	**Timing for specimen collection**	**Transport requirements**	**Collection requirements**	**Other notes**
Pertussis	DFA	NP swab or aspirate	within the first 2 weeks of cough onset	slides can be prepared directly from swabs, or swabs may be placed in a small volume of casamino acids	Dacron or calcium alginate swabs with flexible shafts, or aspiration by catheter attached to catheter trap aspirates: in catheter trap at 4°C	Results are presumptive and should be validated with culture. DFA results are not currently accepted as laboratory confirmation for purposes of national surveillance.
Pneumococcal disease	culture	normally sterile site				
	penicillin resistance	isolate from culture (above)				

Table 3. Specimen collection for laboratory testing for VPDs						
Disease	**Test name**	**Specimens to take**	**Timing for specimen collection**	**Transport requirements**	**Collection requirements**	**Other notes**
Poliomyelitis	culture	stool, pharyngeal swab, CSF		sterile, screw capped container		
	intratypic differentiation	isolate from culture (above)				
	serology	paired sera	acute: ASAP convalescent: 3 weeks after acute			
Rubella	IgM antibody	serum	within 7-10 days of onset			
	IgG antibody	paired sera	acute: within 7-10 days onset convalescent: 2-3 weeks after acute			
	culture/PCR	nasopharyngeal swab/wash, throat, urine, CSF	within 4 days of onset	viral transport media		

Table 3. Specimen collection for laboratory testing for VPDs						
Disease	**Test name**	**Specimens to take**	**Timing for specimen collection**	**Transport requirements**	**Collection requirements**	**Other notes**
Congenital rubella syndrome	IgM antibody	serum	as soon as possible, within 6 months of birth			
	IgG antibody	paired sera				Confirmation is by documenting persistence of serum IgG titer beyond the time expected from passive transfer of maternal IgG antibody.
	culture/PCR	nasopharyngeal swab/wash, urine, blood, CSF	as soon as possible; every 1-3 months until cultures are repeatedly negative	viral transport media		

Table 3. Specimen collection for laboratory testing for VPDs						
Disease	**Test name**	**Specimens to take**	**Timing for specimen collection**	**Transport requirements**	**Collection requirements**	**Other notes**
Varicella	serology	serum	Immune status: collect anytime except during acute illness Paired serologic diagnosis: sera-acute within 7-10 days of onset; convalescent 2-3 weeks after acute			Single IgG assay useful to assess immune status. Paired serum used to identify recent infection, but not method of choice when rapid diagnosis needed.
	direct immuno-fluorescent antibody (DFA)	scraping/swab from base of vesicle	acute illness 2-3 days after rash onset and fresh vesicles			Used for rapid diagnosis.
	culture	fluid from vesicles, nasal or throat swabs, serum, spinal fluid, urine, bronchial tree washing or inflamed joints	acute illness 2-3 days after rash onset and fresh vesicles			Definitive diagnosis, but not useful for rapid diagnosis.
	viral typing/strain identification	viral isolate (from culture)	within 2-3 days of rash	storage more than a few hours must be kept on dry ice or frozen at -70°C or below		Merck and Co., Inc., offers a free viral identification service using PCR analysis (1-800-672-6372).

Table 4. Interpretation of measles enzyme immunoassay results*

IgM Result	IgG Result	Previous infection history	Current infection	Comments
+	– or +	not vaccinated, no prior history of measles	Recently received 1st dose of measles vaccine	Seroconversion. IgG response depends on timing of specimen collection
+	– or +	not vaccinated, no prior history of measles	wild type measles	Seroconversion. Classic clinical measles. IgG response depends on timing of specimen collection
+	– or +	previously vaccinated, primary vaccine failure	Recently received 2nd dose of measles vaccine	Seroconversion. IgG response depends on timing of specimen collection
–	+	previously vaccinated, IgG+	Recently received 2nd dose of measles vaccine	IgG level may stay the same or may boost
+	+	previously vaccinated, IgG+	wild type measles	May have few or no symptoms (e.g., no fever or rash).
+	+	recently vaccinated	exposed to wild type measles	Cannot distinguish between vaccine or wild type virus; evaluate on epidemiologic grounds**
–	+	distant history of natural measles	vaccine	IgG level may stay the same or may boost
+ (at least in some patients)	+	distant history of natural measles	wild type measles	May have few or no symptoms.

* These results are those expected when using the capture IgM and indirect IgG enzyme immunoassays and may not apply to different assays due to different techniques and sensitivities/specificities.

** However, in this circumstance, IgM testing will be helpful if negative; it could rule-out wild type measles infection (if negative).

Table 5. Interpretation of hepatitis B serological tests

HBsAg	anti- HBs	anti-HBc IgM	anti-HBc IgG	Interpretations	Comments
+	-	-	-	early acute infection	patient is infectious; consider vaccination for susceptible household & sexual contacts
+	-	+	+	acute infection	patient is infectious; consider vaccination for susceptible household & sexual contacts
+	-	-	+	chronic infection	patient is infectious; patient should be evaluated for chronic liver disease; vaccinate susceptible household & sexual contacts
-	+	+/-	+	resolved infection	patient is immune
-	-	+	-	"window period" following acute infection	patient is not infectious
-	-	-	+	remote infection with loss of detectable anti-HBsAg; remote infection with possible low-level HBsAg; false positive test	patient is non-infectious in most settings (household, sexual, needlestick exposures)
-	+	-	-	immune following vaccination; resolved infection with loss of detectable anti-HBc	patient is immune